

Irene's Impact on Water Supply

NJ Water Monitoring Council

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Are Impacts Predictable?

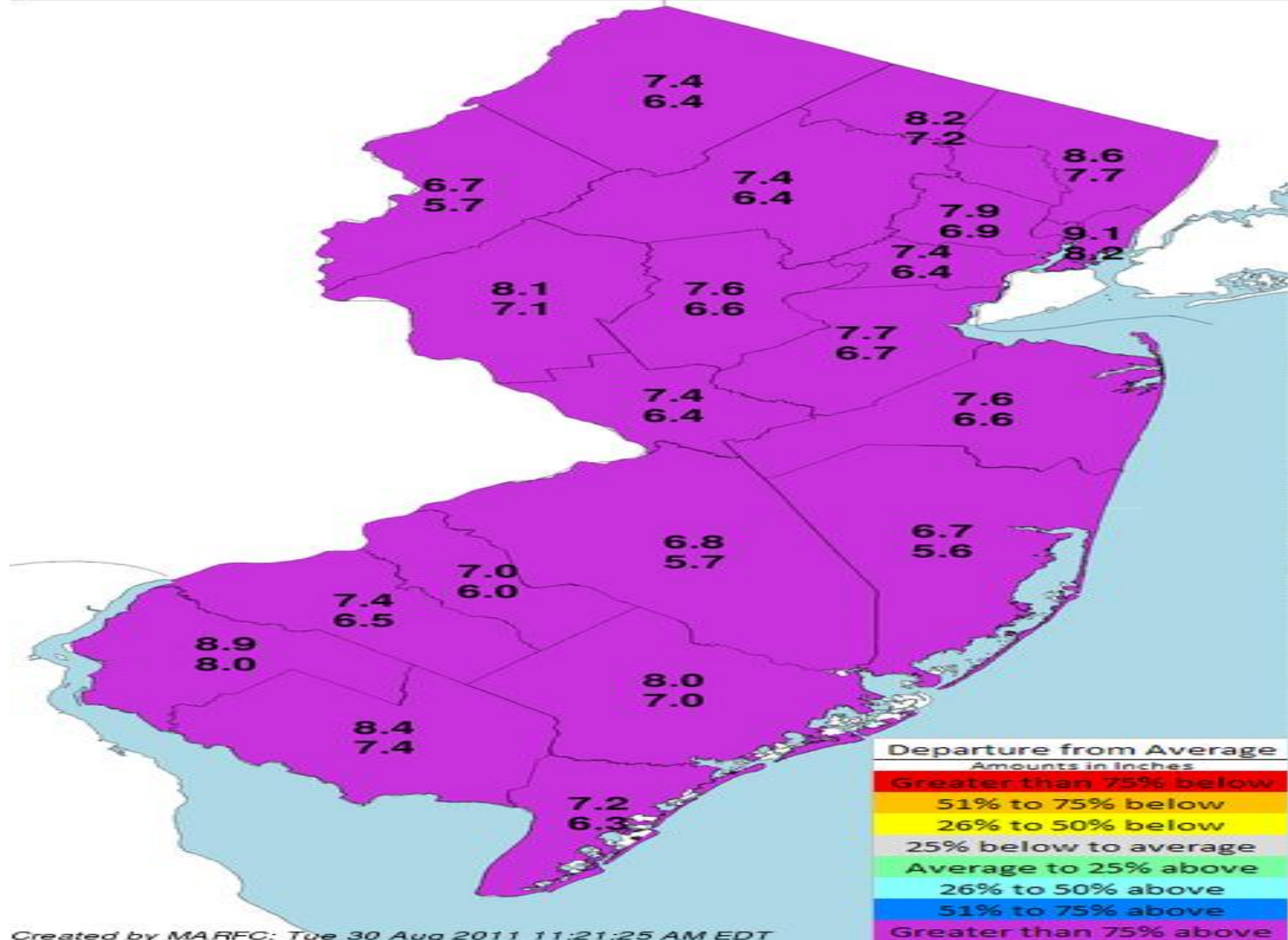
- NOAA – NWS
 - precipitation – 1 hour to
 - streamflow -- 6 hours to 3 days
 - storm track - 6 hours to 5 days
 - storm surge - ?
- Accuweather –
 - precipitation - 3 hours to 20 days
- USGS

Irene's Precipitous Precipitation

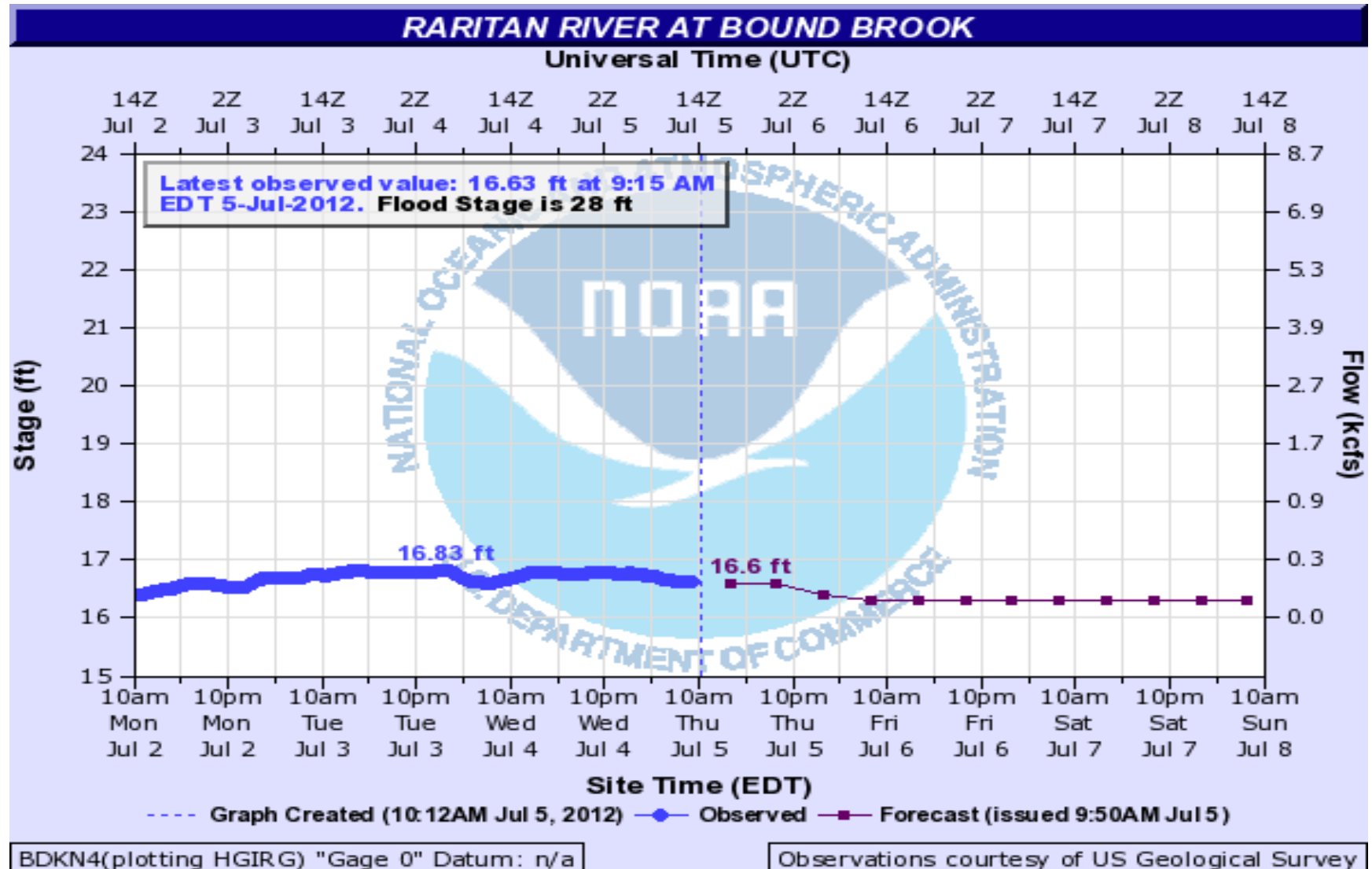
**7 Day Mean Areal Precipitation (top) and
Departure from Average (bottom)**

8/23/2011 through 8/29/2011

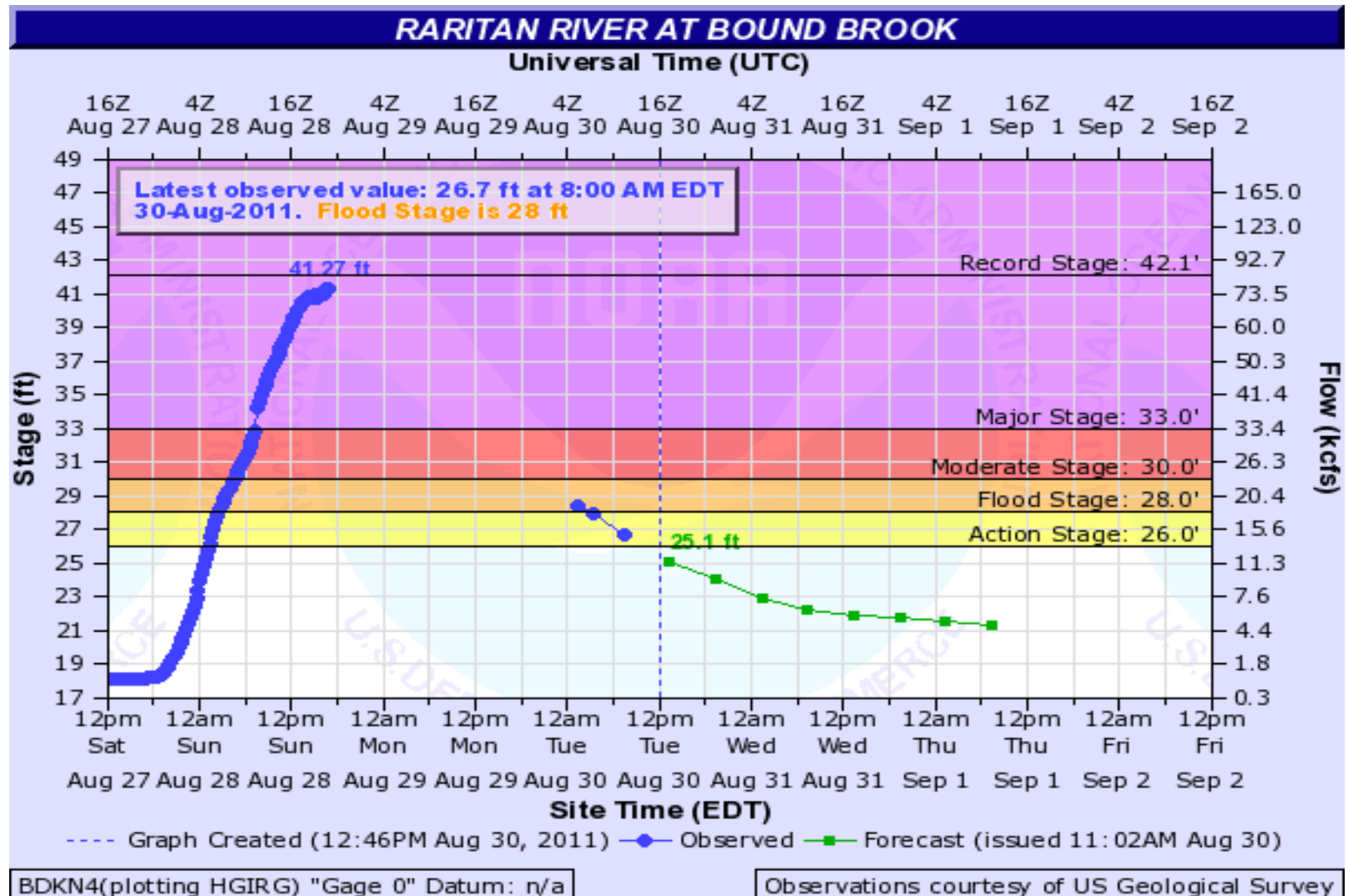
For General Information Only



Between Friday and Sunday NOAA Underpredicts Stage by 20+ feet



Irene Sets Record @ Bound Brook



Can Infrastructure be Protected
from Flooding ?

New Jersey Critical Locations:

Raritan Millstone

Passaic River

D& R Canal

Hightstown

Others

NJWSA Pump Station @ Millstone & Raritan & D&R Canal – 8/30/2001



NJWSA Pump Station & High Water Mark- Sept 19, 2011



D&R Canal Lock overtopped- Irene 2011



D&R Canal Raritan Millstone WTP

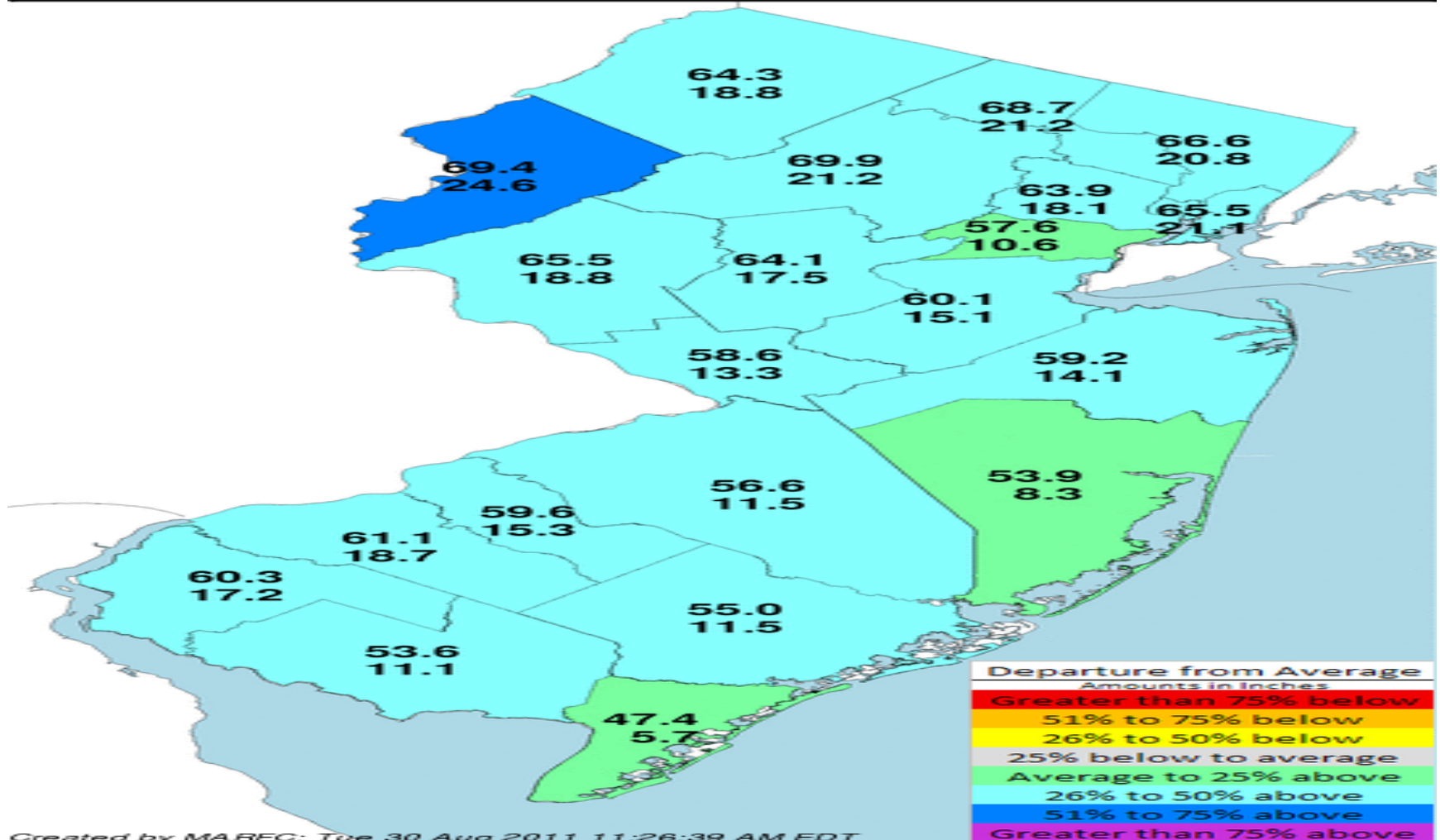


What's coming over what time scale?

- Cycles & Statistics
- 24 hours
- weekly
- seasons
- annually

Will Cyclical Pattern Cause Below Avg Precip by 20+ inches in 365 days?

**365 Day Mean Areal Precipitation (top) and
Departure from Average (bottom)**
8/30/2010 through 8/29/2011
For General Information Only



What is a 100 year storm if 4 occur in the last 10 years?

- **Raritan River @ Bound Brook**

- **Historic Crests**

- (1) 42.13 ft on 09/17/1999**

- (2) 41.90 ft on 08/28/2011**

- (3) 38.38 ft on 04/16/2007**

- (4) 37.47 ft on 08/28/1971**

- (5) 36.04 ft on 03/14/2010**

- **Reference NOAA website**

How can we design and manage systems to avoid failure?

- Reservoirs
- Pumping Stations and Intakes
- WTP & STP siting
- Berm elevation
- Transmission Mains
- Interconnections
- USGS gages for quality and quantity
- i.e. turbidity, nitrate & pathogens

How do Organizations Know When Events outrun Plans? Which Agencies Monitor Resources?

- NJDEP -
- NJDOT
- NJDoHHS
- County
- Municipal
- Private

Water Quality Monitoring on the Passaic River at Two Bridges Forewarns Downstream Supply Intakes

- Nitrate
- Dissolved Oxygen
- Temperature
- Specific Conductivity
- Dissolved Organic Carbon
- Turbidity
- Algal Activity

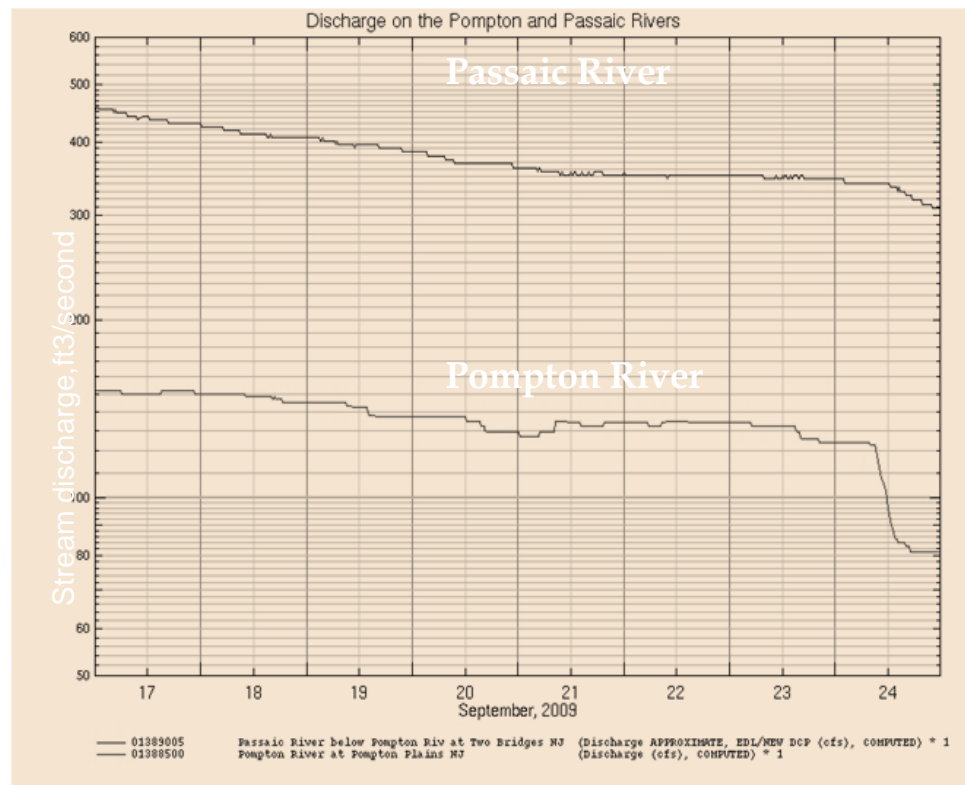
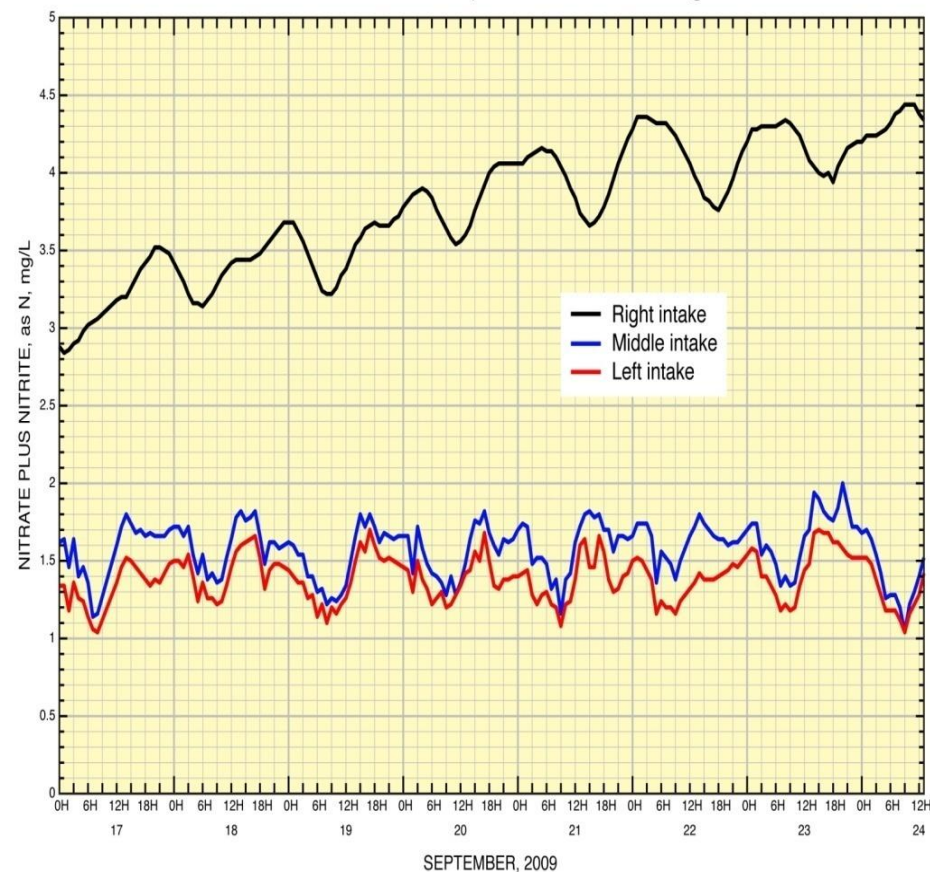
PLUMBING to MONITOR at Three Ports with Three Sensors- Leverage \$

Sample Tank and Automated Cleaning
of Optical Windows



Combine Quality and Quantity Monitors to Manage Nitrate from Point Sources

Passaic River below Pompton River at Two Bridges, NJ



**Continuous NO₂+NO₃
from 9/17 to 9/24/2009**



ROUNDAABOUT WITHOUT CONTROL



ROUNDAABOUT WITH CONTROL



Thank you - USGS & NOAA for
building and standardizing the
water quality and quantity
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